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SURGICAL INSTRUMENT COMPRISING A FIRING SYSTEM INCLUDING A COMPLIANT PORTION

CROSS REFERENCE TO RELATED APPLICATIONS

This non-provisional patent application is a continuation application under 35 U.S.C. §120 of U.S. patent application Ser. No. 13/787,537, entitled END EFFECTOR FOR USE WITH A SURGICAL FASTENING INSTRUMENT, filed on Mar. 6, 2013, now U.S. Patent Application Publication No. 2013/0181030 now U.S. Pat. No. 8,763,875, which is a continuation application under 35 U.S.C. §120 of U.S. patent application Ser. No. 11/529,904, entitled SURGICAL STAPLING INSTRUMENTS AND STAPLES, filed on Sep. 29, 2006, now U.S. Patent Application Publication No. 2008/0078800 now U.S. Pat. No. 8,720,766, the entire disclosures of which are incorporated by reference herein.

The subject application is related to eleven commonly-owned applications filed on Sep. 29, 2006, the disclosure of each is hereby incorporated by reference in their entirety, these eleven applications being respectively entitled:

(1) U.S. patent application Ser. No. 11/540,735, entitled SURGICAL STAPLING INSTRUMENTS HAVING FLEXIBLE CHANNEL AND ANVIL FEATURES FOR ADJUSTABLE STAPLE HEIGHTS, now U.S. Pat. No. 7,467,740;

(2) U.S. patent application Ser. No. 11/540,734, entitled SURGICAL STAPLING INSTRUMENTS WITH COLLAPSIBLE FEATURES FOR CONTROLLING STAPLE HEIGHT, now U.S. Pat. No. 7,472,815;

(3) U.S. patent application Ser. No. 11/541,050, entitled SURGICAL CUTTING AND STAPLING INSTRUMENT WITH SELF ADJUSTING ANVIL, now U.S. Pat. No. 8,360,297;

(4) U.S. patent application Ser. No. 11/541,151, entitled SURGICAL CUTTING AND STAPLING DEVICE WITH CLOSURE APPARATUS FOR LIMITING MAXIMUM TISSUE COMPRESSION FORCE, now U.S. Pat. No. 7,665,647;

(5) U.S. patent application Ser. No. 11/541,164, entitled SURGICAL STAPLING INSTRUMENT WITH MECHANICAL MECHANISM FOR LIMITING MAXIMUM TISSUE COMPRESSION, now U.S. Pat. No. 7,506,791;

(6) U.S. patent application Ser. No. 11/529,879, entitled SURGICAL STAPLING INSTRUMENT WITH MECHANICAL INDICATOR TO SHOW LEVELS OF TISSUE COMPRESSION, now U.S. Pat. No. 8,348,131;

(7) U.S. patent application Ser. No. 11/541,374, entitled SURGICAL STAPLES HAVING DISSOLVABLE, BIOABSORBABLE OR BIOFRAGMENTABLE PORTIONS AND STAPLING INSTRUMENTS FOR DEPLOYING THE SAME, now U.S. Pat. No. 8,365,976;

(8) U.S. patent application Ser. No. 11/541,098, entitled CONNECTED SURGICAL STAPLES AND STAPLING INSTRUMENTS FOR DEPLOYING THE SAME, now U.S. Pat. No. 8,220,690;

(9) U.S. patent application Ser. No. 11/529,935, entitled SURGICAL STAPLES HAVING ATTACHED DRIVERS AND STAPLING INSTRUMENTS FOR DEPLOYING THE SAME, now U.S. Pat. No. 8,485,412;

(10) U.S. patent application Ser. No. 11/541,182, entitled SURGICAL STAPLES AND STAPLING INSTRUMENTS, now U.S. Patent Application Publication No. 2008/0078802; and

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(11) U.S. patent application Ser. No. 11/541,123, entitled SURGICAL STAPLES HAVING COMPRESSIBLE OR CRUSHABLE MEMBERS FOR SECURING TISSUE THEREIN AND STAPLING INSTRUMENTS FOR DEPLOYING THE SAME, now U.S. Pat. No. 7,794,475.

FIELD OF THE INVENTION

The present invention generally relates to endoscopic and open surgical instrumentation and, more particularly, to surgical staples and staplers including, but not limited to, open surgical stapling devices, laparoscopic surgical stapling devices, endoscopic and intraluminal surgical stapling devices.

BACKGROUND

Endoscopic and laparoscopic surgical instruments are often preferred over traditional open surgical devices since a smaller incision tends to reduce the post-operative recovery time and complications. The use of laparoscopic and endoscopic surgical procedures has been relatively popular and has provided additional incentive to develop the procedures further. In laparoscopic procedures, surgery is performed in the interior of the abdomen through a small incision. Similarly, in endoscopic procedures, surgery is performed in any hollow viscus of the body through narrow endoscopic tubes inserted through small entrance wounds in the skin.

Laparoscopic and endoscopic procedures generally require that the surgical region be insufflated. Accordingly, any instrumentation inserted into the body must be sealed to ensure that gases do not enter or exit the body through the incision. Moreover, laparoscopic and endoscopic procedures often require the surgeon to act on organs, tissues and/or vessels far removed from the incision. Thus, instruments used in such procedures are typically long and narrow while being functionally controllable from a proximal end of the instrument.

Significant development has gone into a range of endoscopic surgical instruments that are suitable for precise placement of a distal end effector at a desired surgical site through a cannula of a trocar. These distal end effectors engage the tissue in a number of ways to achieve a diagnostic or therapeutic effect (e.g., endocutter, grasper, cutter, staplers, clip applier, access device, drug/gene therapy delivery device, and energy device using ultrasound, RF, laser, etc.).

Known surgical staplers include an end effector that simultaneously makes a longitudinal incision in tissue and applies lines of staples on opposing sides of the incision. The end effector includes a pair of cooperating jaw members that, if the instrument is intended for endoscopic or laparoscopic applications, are capable of passing through a cannula passageway. One of the jaw members receives a staple cartridge having at least two laterally spaced rows of staples. The other jaw member defines an anvil having staple-forming pockets aligned with the rows of staples in the cartridge. The instrument includes a plurality of reciprocating wedges which, when driven distally, pass through openings in the staple cartridge and engage drivers supporting the staples to effect the firing of the staples toward the anvil.

Recently, an improved "E-beam" firing bar was described for a surgical stapling and severing instrument that advantageously included a top pin that slides within an internal slot formed in the upper jaw (anvil) and has a middle pin and bottom foot that slides on opposite sides of a lower jaw of an end effector, or more particularly a staple applying assembly. Distal to the middle pin, a contacting surface actuates a staple